Acknowledgements

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INTRODUCTION

1. Introduction

1.1. Experian overview:

1.1.1. About Experian: "Experian is a global leader in providing information, analytical and marketing services to organisations and consumers to help manage the risk and reward of commercial and financial decisions" (Experian website, 2009). Experian UK, partners with more than 100,000 clients across multiple industry sectors providing businesses with competitive advantage and delivering real value to customers by combining the power of information assets and expertise that is unmatched in the industry. Experian helps clients business by providing services and products to simplify business decisions, manage risk extensively, find, manage, develop and retain customers. Experian is the only UK Company to win "Business of the Year" award twice. "Experian's vision is for its people, data and technology to become a necessary part of every major consumer economy around the world" (Experian report, 2009).

1.1.2. Principal Activities: The business is categorised into four principle activities (Experian report, 2009).

1.1.2.1. Credit Services: Consumers and businesses can handle credit risks effectively with a deep insight provided by Credit Services, underlying which is a comprehensive information bundle of credit application and repayment history of millions of consumers and businesses.

1.1.2.2. Decision Analytics: The potential of the large critical consumer and business data is harnessed through proprietary analytical tools and software to enable clients to make accurate and prompt business decisions.

1.1.2.3. Marketing Services: The vital geographic, demographic and lifestyle information about millions of UK customers provides clients with crucial information necessary to increase their business value by targeting, acquiring, managing and retaining customers.

1.1.2.4. Interactive: It enables direct-to-consumer activity where consumers can directly obtain their credit reports on the internet and in addition provides lead generation capability which unconventionally connects consumers with business.

1.1.3.Experian UK Businesses:

1.1.3.1. Experian Automotive: The motor companies, motor finance companies and motor insurance companies and other automotive related industries derive a significant benefit from the powerful data insight and independent assessment of vehicles, prospective business partners, customers and employees provided by the Experian's automotive division (Experian automotive website).

1.1.3.2. Credit Expert: It is an online credit monitoring and fraud protection service under the direct-to-business model (Experian Creditexpert website).

1.1.3.3. Experian Background Checking: Employee screening and vetting -offering by Experian background checking has grown to become one of the UK's leading employment screening companies (Experian Background checking website).

1.1.3.4. Experian Business Information: Experian delivers a valuable combination of data and analytics to help manage business risk, generate more business and to understand other partner businesses (Experian Business Information website).

1.1.3.5. Experian Business Strategies: provides a detailed understanding of consumers, markets and economies to optimise customer value, maximise the business location value, and invest in the future opportunities (Experian Business strategies website).

1.1.3.6. Experian CheetahMail: offers industry leading email marketing and customer intelligence solutions for clients to build data-driven, relevant relationships with customers (Experian Cheetahmail website).

1.1.3.7. Experian Decision Analytics: Provides leading edge decision analytic tools for making business decisions.

1.1.3.8. Experian Footfall: helps clients to optimise site performance based on measured consumer behaviour, consumer numbers, and sales conversion rates (Experian footfall website).

1.1.3.9. Experian Integrated marketing: EIM helps client make use of customer intelligence to make decision at every stage of marketing life cycle and execute intelligent multi-channel marketing (Experian Integrated marketing website).

1.1.3.10. Experian Payments: provides bank account validation and payment processing solutions to meet the needs of the world's leading banks and corporate organisations to control cost, reduce risk and provide better customer service (Experian payments website).

1.1.3.11. Experian QAS: is a leading supplier of address management and data integrity solutions enabling clients mitigating the risk of inaccurate data and identity fraud (Experian QAS website).

1.1.3.12. Future Foundation: advises clients on how to plan for the future with changing customer needs by understanding the social and consumer trends that impact on market, services, brands and products (Experian future foundation website).

1.1.3.13. Hitwise: provides insight on how more than 8 million UK Internet users interact with more than 1 million websites across 165 industries to identify competitive insights and grow online business (Experian Hitwise website).

1.1.3.14. LowerMyBills : It helps consumers by providing online comparison of the cheapest credit cards, loans and mortgages, Insurance, Energy costs etc (Experian Lowermybills website).

1.1.3.15. N4 Solutions: develop software for all aspects of financial services distribution and fulfilment, including joining up of distribution of all financial services products like mortgage, credit card, insurance, loans etc (Experian N4 solutions website).

1.1.3.16. pHgroup: helps clients to understand their customer base and identify new business opportunities to achieve a sustainable organic growth (Experian pH website).

1.1.3.17. PriceGrabber: is an online comparison shopping portal for smart and savvy shopping providing detailed product information, comparisons and email notifications to customers (Experian pricegrabber website).

1.1.3.18. Unclaimed assets register: is a unique search service that helps to find lost assets and re-establish contacts with financial institutions (Experian unclaimed asset register website).

1.2. Project Background:

1.2.1. Project Context: Experian has its origin in the information service business division (CCN) established by the parent company GUS in 1980. CAIS system enabled credit lending organisations to share credit account information about individuals, in turn becoming UK's leading credit bureau. CCN was renamed Experian globally in 1997. The splendid history of

Experian encapsulates a strong organic growth coupled with several acquisitions like CheetahMail, QAS, The Future Foundation group, Hitwise, N4 solutions, pH group etc (Experian History). The current infrastructure of Experian has served the clients well for more than 20 years. The marketing and credit risk businesses however have been reliant on data within the infrastructure which are in silos. A stiff pricing and quality expectations of Experian products and services, by the clients has made it indispensable for Experian to drive the costs down significantly whilst increasing the product quality. The limiting factor of the business to deliver such a value proposition and simultaneously maintain the leading market position is the current IT infrastructure. The multiple database technologies and data duplication issues results in inflexibility and increased cost of product development. A more agile, flexible, high performance new infrastructure with a common technology platform consistent with Experian's global infrastructure is the need of the hour.

1.2.2. Internship Project Definition: *How can the discipline of business case definition ensure that IT infrastructure programmes are completed successfully and deliver business value?* The gargantuan task ahead to build a new IT infrastructure that can empower Experian's vision and future strategies requires meticulous planning to manage the known risks and procedures while being flexible enough to handle the unknown whitespace risks. The internship project is regarding exploiting the discipline of business case definition with respect to successfully implementing (not defining) the new IT infrastructure that can deliver maximum business value.

Methodology

2. **Methodology**: The number of aspects that contribute to make an IT infrastructure project to be successful is infinite. A business case to a great extent considers all those aspects and acts as a light house during the implementation of the IT infrastructure. The existing literature contains a vast amount of information most of which raise a debate about the value added by the IT infrastructure. However when we consider the components of the business case which are presented in the literature review section, each component is a discipline in itself which contributes to the success of the IT infrastructure project. Apart from the journals on the debate raised about the IT value, there are innumerable academic journals that assist to develop each component of the business case. Each component encapsulates some of the critical aspects that contribute to the process of IT infrastructure development. The internship project focuses less on the financial *estimation* of implementing the project and more on *factors* affecting the success and IT value. Consequently the components corresponding to this scope is included in the literature review section which is further used for our analysis and discussion.

   In the first stage of the project, the various literatures corresponding to each component was studied to understand the current context and to facilitate further analysis. The various concepts and frameworks thus gathered were used to develop the literature review section.

   The concepts and frameworks mentioned in the literature review section generated many questions that were necessary for further analysis. Several interviews with key individuals of the business were carried out to obtain the answers for those questions. In parallel to the

interview and with the obtained information, the analysis of the project was carried out.

The specification, the literature and the information in the analysis section were weaved in the discussion section to generate the outcome. Finally, the necessary conclusions and recommendations are derived and presented.

Literature Review

3. Literature Review:

This literature review section consists of various concepts and frameworks from the academic literature which are relevant to the current project. These concepts and perspectives are seamlessly integrated in the analysis and discussion section to develop the critical understanding necessary to derive the conclusions and recommendation. A brief description of the concepts is presented in this section which enables the reader to better understand the analysis and discussion sections.

3.1. Business Case Development:

3.1.1. Business Case Definition:

According to Prince2 project methodology a business case is a document which includes the information which justifies the setting up, continuation or termination of the project. Appendix A mentions the various processes in which the business case is involved according to prince2 project management methodology (Heemst et al, 2005).

A business case is the orientation of the project to the value creation (Festa et al, 2008).The expected benefits should outweigh the costs and risks involved in the project. Usually a more risky project has higher business benefits. Thus the business case is closely linked to risk management. A business case is used for making decision about the projects viability during the approval, implementation or closure stages of the

project. Hence a business case is a dynamic document updated minimally at various stages of the project and it improves the decision making quality (Ken Bradely Understanding Prince2, 2002, SPOCE project management limited 2002). Writing a concise and compelling business case to secure the approval from corporate management is challenging.

3.1.2. Business Case Development Process: The business case is often written before that start of the project and is an indispensable first step in an IT investment. The IT business case development involves several steps which are as shown in the figure 1 below. The preparation of the business case is an iterative process in itself which involves inputs from various stakeholders who will be benefitted from the project. (Remenyi, 1999)

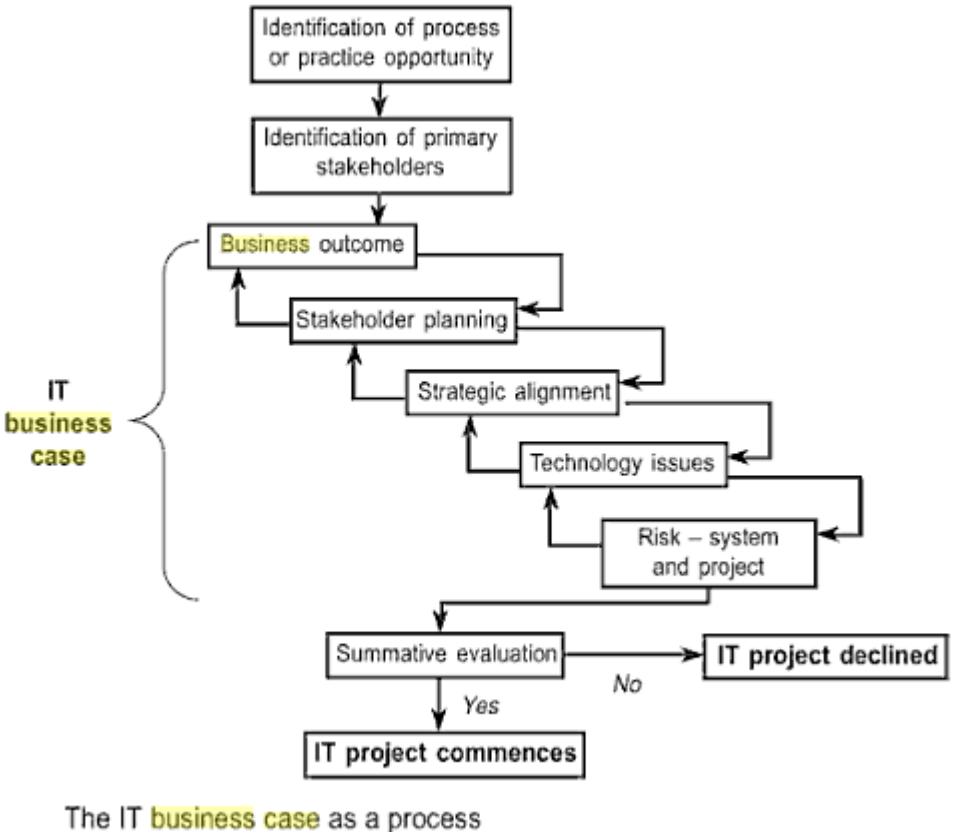


Figure 1: IT business case development process

3.1.3. Elements of Business Case: According to (Remenyi, 1999) the five aspects which are used to broadly develop an IT

investment business case are as shown in the figure 2. They are

- the business outcomes,
- the stakeholders,
- the strategic alignment,
- the risks and
- the technology.

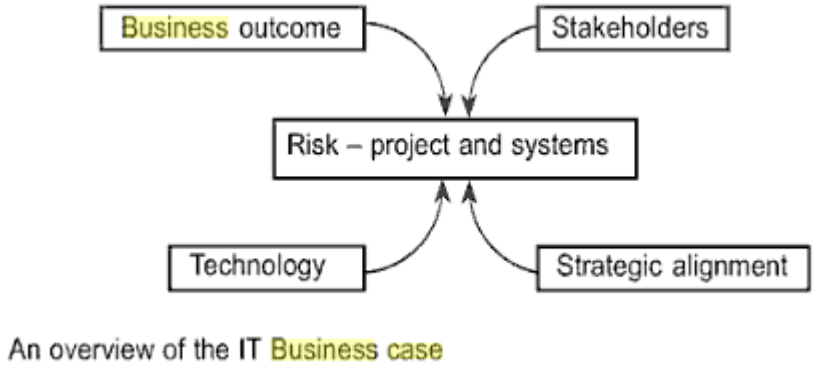


Figure 2: An overview of the IT Business Case

The vital components of the business case mentioned by various literature sources are similar which is as shown in the table below.

Authors	**Festa et al, 2008**	**Ken Bradely, 2002**	**Mclaughlin, 2004**	**Heemst, 2005**
components	Reasons	A statement of benefits	Background	Reasons
	Options	The options available	Description	Options
	Benefits	The benefits	Strategic alignment	Benefits
	Cost and Time	Costs and Timescale	Environmental analysis	Risks
	Evaluation		Alternatives	Costs and Timescales

	Cash Flow		Impact Assessment	Investment appraisal
			Risk Management	
			Cost benefit	
			Recommendation	
			Project Implementation	

Thus the various vital components of the business case can be summarised to include background, reasons for investment, strategic alignment, stakeholder engagement, benefits, costs, options available, risk management, investment appraisal, implementation (organisation roles and responsibilities). Further to the above vital components each business case can have components specific to the projects. *Each and every component of the business case is a discipline in itself which contributes to the successful completion of the IT project.*

A broad range of knowledge is required to develop a business case; hence the business case owner needs to surround himself with those who have the complementary skills and information (Mclaughlin, 2004). A large project requires a group of specialists to write the business case while for a small project one person would suffice (Heemst, 2005).

The current report is thus concerned with business strategic alignment, stakeholder engagement, value proposition (benefits), implementation (roles and responsibilities) and risk management as mentioned in the figure 3 below, which to a large extent ensures the successful completion of IT projects to deliver business value.

Figure 3: Key aspects of business case considered in the report

3.2. Business Strategic Alignment:

3.2.1. Strategic Alignment Model:

Henderson et al are of the opinion that the inability to realize value from infrastructure investments is partly due to lack of alignment between business and IT strategies. They propose a strategic alignment model which is as shown in the figure 4 below.

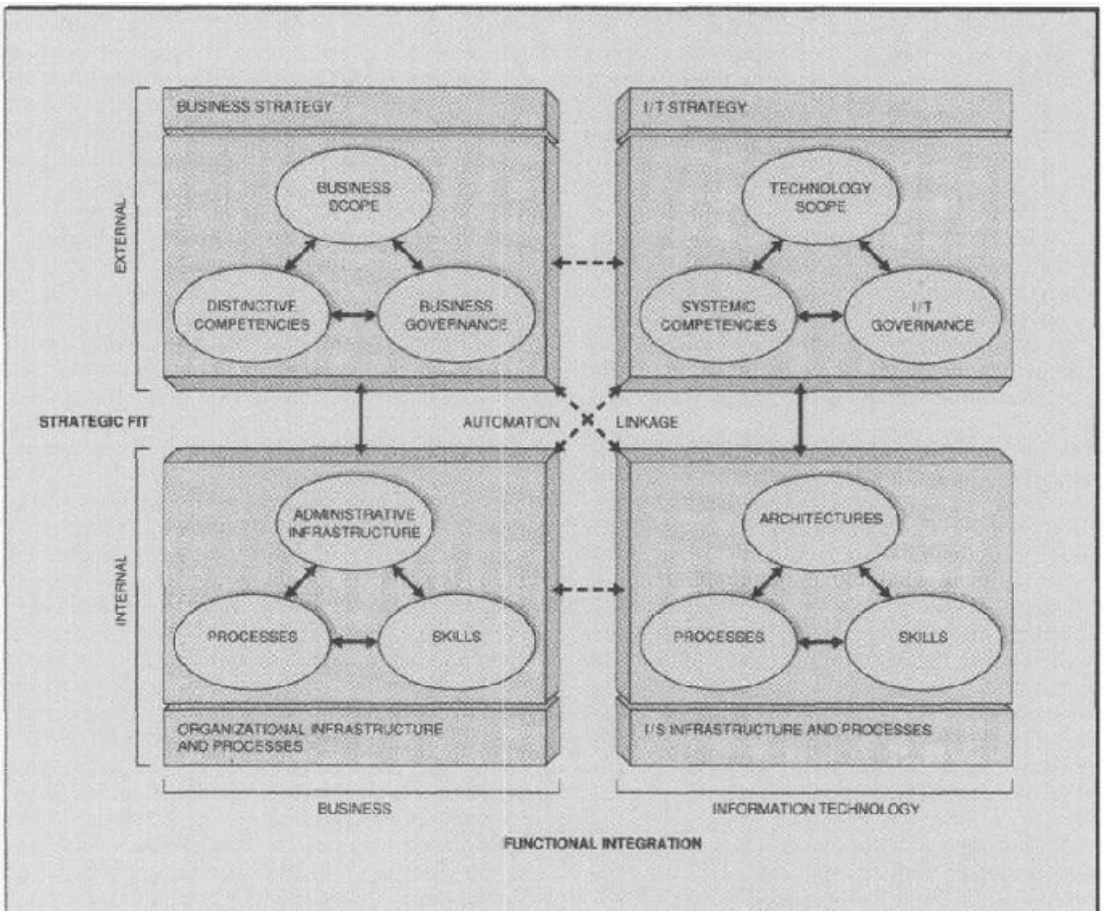


Figure 4: Strategic Alignment Model

It consists of business and IT domains each of which have an internal and external domain. By considering a set of domains at a time the authors offer many alignment perspectives that can help better realise value from IT.

(Henderson,1999)

3.2.1.1. The external domain of the I T function consists of

3.2.1.1.1. Information Technology Scope: This analogous to business scope which deals with product and service offerings in the market. The scope of the IT strategy that support current business strategy or shape new business strategy defines the IT scope.

3.2.1.1.2. Systemic Competencies: The attributes that contribute positively to the creation of new business strategies like flexibility, interconnectivity, reliability etc.

3.2.1.1.3. I/T governance: The external mechanisms like choosing vendors, strategic alliance, joint research and development, marketing exchange, technology licensing etc.

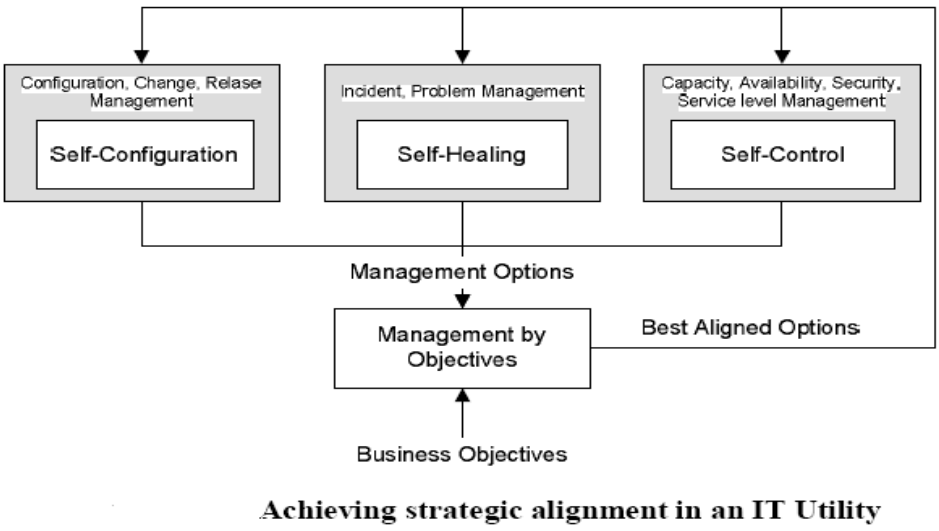
3.2.1.2. The internal domain of the IT function consists of

3.2.1.2.1. I/S Architecture: The choices that define the portfolio of application and configurations of hardware, software and communication.

3.2.1.2.2. I/S Processes: These are the processes like system development, monitoring and control systems to execute the IS architecture.

3.2.1.2.3. I/S Skills: These are the choices pertaining to acquisition, development, training and capabilities of the individuals required to manage the I/S infrastructure.

3.2.2. Achieving strategic alignment: (Salle et al, 2004). IT strategic alignment can be achieved by Management by objectives model as shown in the figure 5 below. The business objectives are assessed with respect to management options to determine the best aligned option.



Achieving strategic alignment in an IT Utility

Figure 5: Achieving Strategic Alignment by management by objectives

3.3. Value Proposition:

3.3.1. Three Dimensions of IT value: Hitt et al, (1996) make use of the theory of production, theory of competitive strategy, theory of consumer to come up with three dimensions of IT value that can guide our analysis. The IT value can vary depending upon the vantage point chosen

3.3.1.1. Productivity: It is defined as production of more output for a given quantity of inputs by the IT infrastructure.

3.3.1.2. Business Profitability: It refers to the use of IT to gain competitive advantage and earn higher profits.

3.3.1.3. Consumer Surplus (value): This refers to the magnitude of the benefits that have been passed on to the consumers.

3.3.2. IT Business Value Model: (Melville et al, 2004) Melville et al define IT values as "the organisational performance impacts of information technology at both the intermediate process level and organisation wide level and compromising both efficiency and competitive impacts". They develop an IT business value framework which says that IT value is dependent on many internal and external factors including complementary organisational resources, competitive environment and Macro environment as shown in the figure 6.

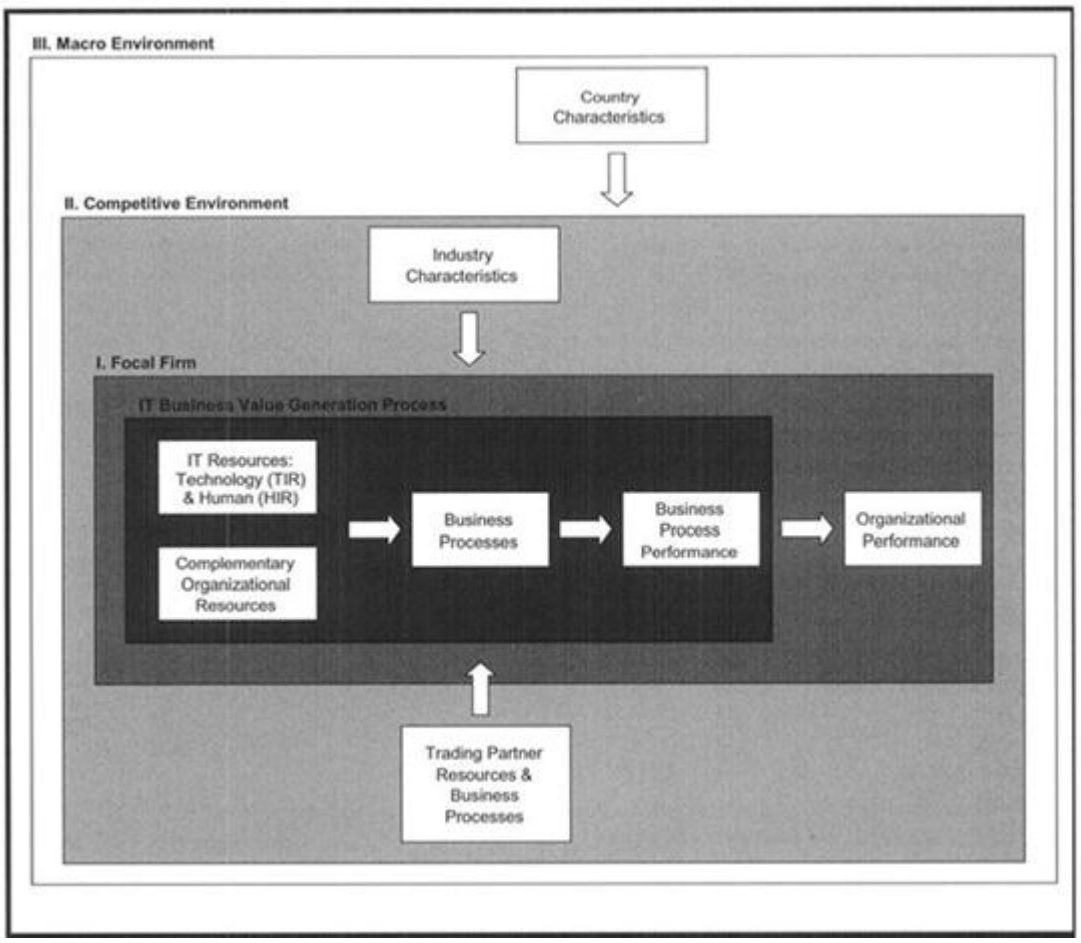


Figure 6: IT Business Value Model

3.3.3. The model consists of

3.3.3.1. Focal Firm: The internal factors in the firm, the IT resources and complementary organizational resources add value to the business processes contributing to the organizational performance which generates the IT business value.

3.3.3.1.1. Information Technology Resource: It consists of IT capital investment, IT infrastructure, and human capital.

3.3.3.1.2. Complementary Organisational Resource: It consists of aspects like policies and rules, organizational structure, workplace practices and organizational culture. Any resource which along with IT resources generates synergy is called as complementary organisational resource.

3.3.3.1.3. Business Process activities underlying the value generating process

3.3.3.1.4. Performance:

3.3.3.1.5. Operational Efficiency: It is similar to Brynjolfsson et al's productivity dimension which include efficiency of business processes, flexibility etc.

3.3.3.1.6. Organizational performance: This includes profitability, competitive advantage, market value, inventory reduction, cost reduction etc.

3.3.3.2. Competitive Environment:

3.3.3.3. Industry Characteristics: The way in which IT is applied to generate business value this includes regulation, competitiveness, trends etc.

3.3.3.4. Trading Partners Resource: IT and Non-IT resources of vendors and other business partners.

3.3.3.5. Macro Environment: The macro factors shaping IT application and IT business value generation like infrastructure, population, culture, education etc.

3.3.4. A process oriented model of business value: Mooney et al (2001) developed a model as shown in the figure 7 below to study the business value of IT which included

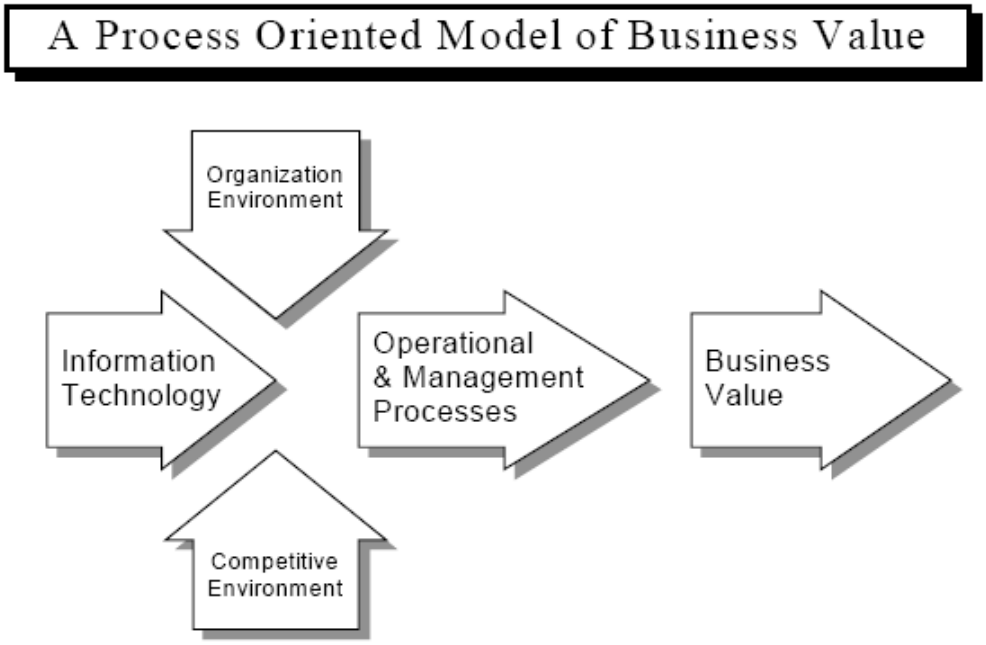


Figure 7: A process oriented model of business value

3.3.4.1. A typology of business processes: This constitutes the business processes like product development, marketing, sales, management and operational processes that are impacted by the IT.

3.3.4.2. A typology of potential impact of IT on those processes: Cost reductions and quality improvements are the two main goals of an IT investment across many companies. There are many other parameters of IT project that impact the business value which forms the second step of this model.

3.3.4.3. A framework for analysing the business value of IT: From the previous two steps a framework is developed as shown in the figure to analyse the business value with respect to

3.3.4.3.1. Automational Effects: The cost benefits and labour benefits of IT mainly constitute the automational effects.

3.3.4.3.2. Informational Effects: It is the effects of IT on decision quality, quality, organizational effectiveness etc.

3.3.4.3.3. Transformational Effects: It is the effect of IT on the ability to support new processes and transformation, reduce cycle times, improve responsiveness, and enhance services and products.

3.4. Stakeholder Engagement:

3.4.1. A three phase methodology:

Engaging the stakeholders of Infrastructure project, especially the internal stakeholders throughout the multiyear project is indispensable. The literature on stakeholders typically deals with stakeholders external to the company which is shown in the figure 8 below (Patridge et al, 2005).

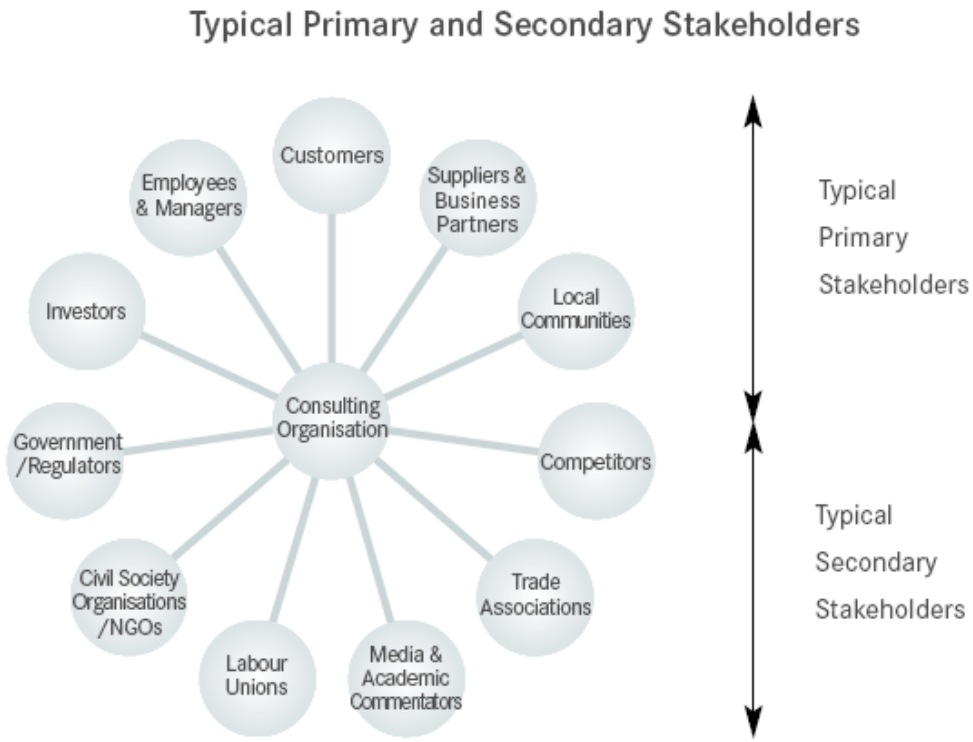


Figure 8: Typical Stakeholders

However the stakeholders in the Infrastructure project are different. The infrastructure project is like a business within a

business. Correspondingly the infrastructure project will have internal clients who are responsible for product delivery and the external clients to whom the product is delivered. Similarly other business units in the organisation act as the stakeholders in the project. Therefore the literature of stakeholder engagement is extended to the infrastructure stakeholder engagement methodology.

Gable et al (Gable et al, 2005) propose a three phase methodology to engage stakeholders. The three phases are

- Phase one: Internal Preparation: This involves finding a right leader and building a team that communicates with the various stakeholders. The team can consist of various stakeholder representatives from different business units.
- Phase two: Creating a stakeholder engagement strategy: which involves stakeholder identification, mapping stakeholder roles to business objectives.
- Phase three: Implement the engagement strategies, measure and monitor results and communicating appropriately.

3.4.2. Stakeholder Typology: (Mitchell et al, 1997) Mitchell et al use three attributes to determine the stakeholder-firm relationship. They are

- Power: It is defined as "a relationship among social actors in which one social actor, A, can get another social actor, B, to do something that B would not have otherwise done". Power is often unevenly spread across the firm's stakeholder relationship.
- Legitimacy: It is defined as "a generalised perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, definitions".
- Urgency: It is defined as "the degree to which stakeholder claims call for immediate attention"

Additionally Stakeholder Salience is defined as "the degree to which managers give priority to competing stakeholder claims".

Having identified the attributes of stakeholder firm relationship, Mitchell et al further define Stakeholder Typology to identify the stakeholder salience which is as shown in the figure 9.

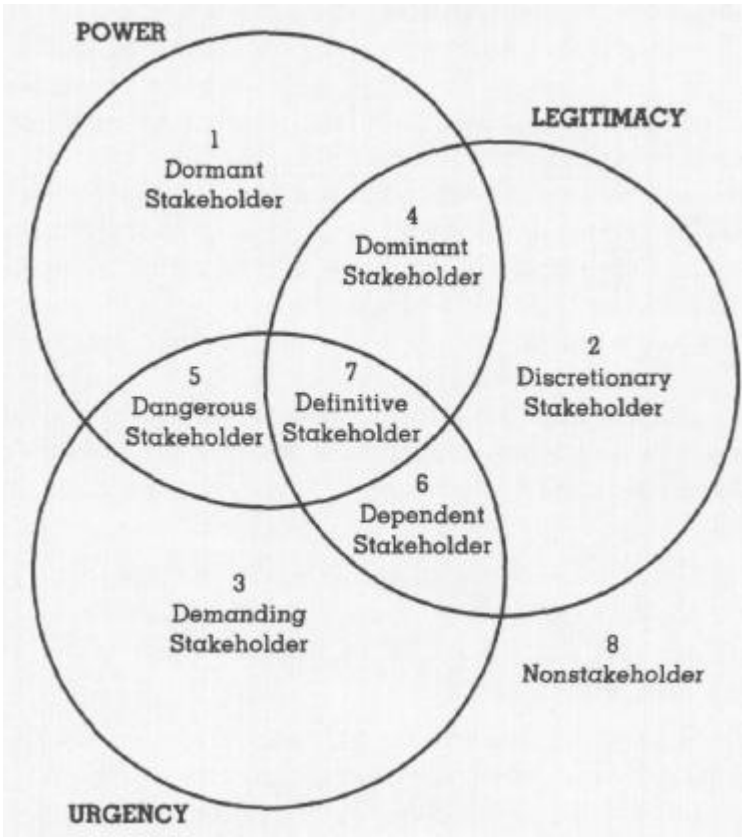


Figure 9: Stakeholder Typology

The stakeholder typology consists of 8 different kinds of stakeholders and the engagement strategies vary according to the stakeholder salience. According to Mitchell et al the salience of stakeholders who have one attribute is less than that of those who are defined by two attributes which is less than that of those who are defined by all three attributes (power, legitimacy, urgency).The eight kinds of stakeholder classes are

- Dormant Stakeholder: They have the power to impose their will but without legitimacy and urgency claim their power remains unused.
- Discretionary Stakeholder: They do not have the power or urgency claim in the relationship. Even though they possess the legitimacy attribute, the managers may not engage in an active relationship with such a stakeholder.
- Demanding Stakeholder: The sole attribute of a demanding stakeholder is urgency.
- Dominant Stakeholder: The influence of dominant stakeholder in the project is assured because they possess the power and legitimacy. The level of engagement between managers and dominant stakeholders is higher.
- Dangerous Stakeholder: A stakeholder who is not characterised by legitimacy but has the power and urgent claims can be coercive and violent.
- Dependent Stakeholder: The stakeholders who lack power but have urgent legitimate claims and they depend on other stakeholders to exercise their will.
- Definitive Stakeholder: The managers give the highest priority to the definitive stakeholders as they have all the three attributes of urgency, power and legitimacy. Urgent claims of powerful and legitimate stakeholders are given the highest priority.
- The rest are non stakeholders

3.5. Roles and Responsibilities:

3.5.1. Defining various roles and responsibilities forms a crucial part of IT governance. (Salle et al, 2004) IT governance institute (ITGI) defines "IT Governance is the responsibility of Board of Directors and executive management. It is an integral part of enterprise governance and consists of the leadership and

organisational structures and processes that ensure that the organization's IT sustains and extends the organisation's strategy and objectives". IT governance faces dual challenge of contributing to the present business operations and performance and transforming IT for meeting future business challenges as shown in the figure 10 below

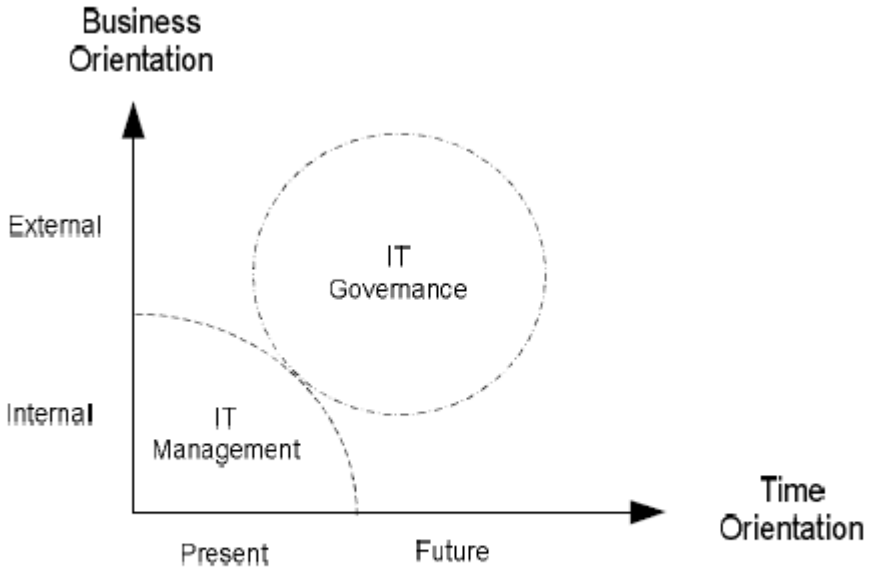


Figure 10: IT Governance and IT management

3.5.2. Rau (Rau et al, 2004) in their article presents concepts about roles and responsibilities that can be adapted to needs, styles and structures of different organisations. The concept is as shown in the figure 11 which emphasises simple, easy to

understand structure for managing and directing the project.

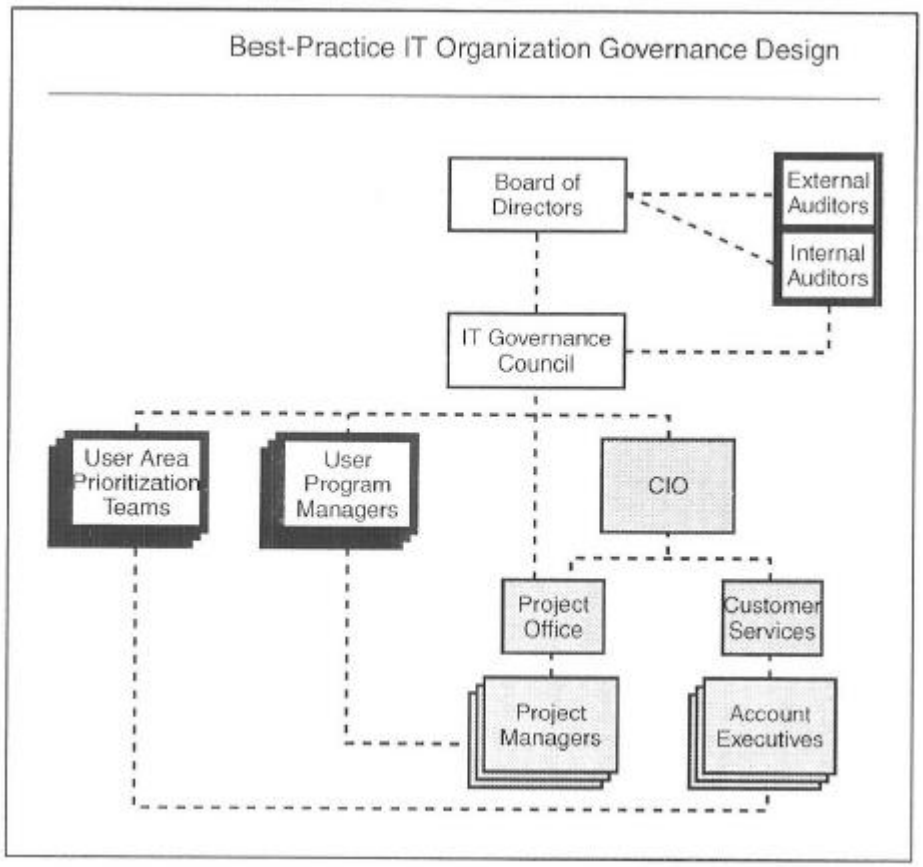


Figure 11: Best Practice in IT governance

3.5.3. It consists of support hierarchy with following roles although the names of these vary in different organisation.

3.5.3.1. IT Governance Council (Steering Committee): They provide organisational direction and funding authority for major technical projects. It carries out functions like policy setting, budget control etc.

3.5.3.2. Chief Information Officer (CIO): The CIO carries out functions along with the IT governance council to determine future direction, counsel etc.

3.5.3.3. Customer Services and Products: Assisting the CIO is a variety of roles like account executives, account heads, business analysts who are aware of the clients business completely. Plan, architect and technology needs of the IT organisations are also prioritised by them.

3.5.3.4. Project Office: They develop standards and procedures for projects and programs in IT, prepares reports on project status and technology budget results.

3.5.3.5. User area prioritisation teams: They determine the pipeline of projects and enhancement to be implemented using the funding provided by the IT governance council. They also negotiate with the council to acquire funds for their area.

3.5.3.6. User Program Managers: The User program manager is the head of each major IT project undertaken by the organisation. They are functionally knowledgeable and work with IT project managers, project leads, business analysts etc.

3.6. Risk management: The risks involved in an Infrastructure project are innumerable. (Ropponen et al, 2000) IT projects are often subjected to cost overruns, schedule overruns, unmet user needs. According to Conrow et al (Conrow et al, 1997) risk is defined as "the probability of failing to achieve particular cost, performance, and schedule objectives, and the consequences of failing to achieve those objectives. The risk management process is a closed loop process which involves several stages as shown in the figure 12 below.

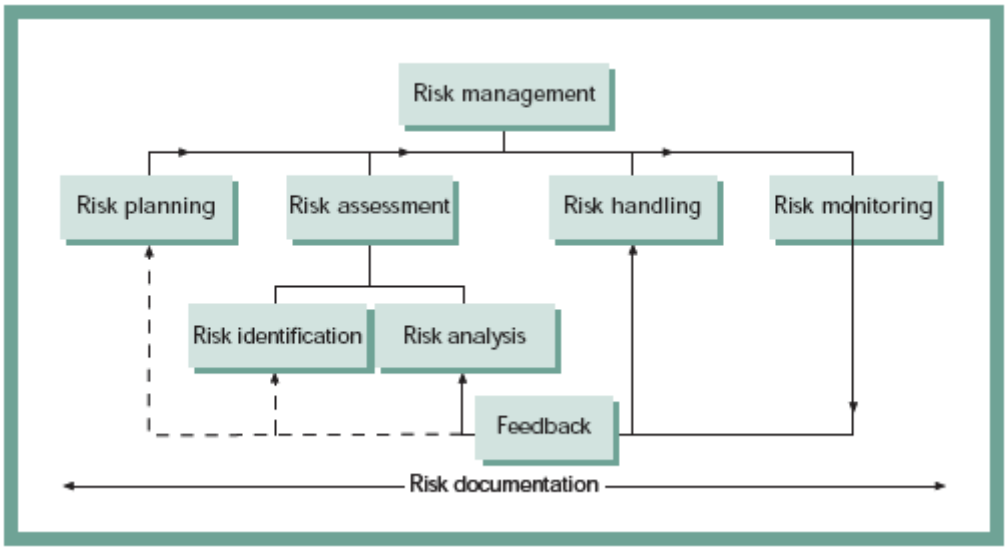


Figure 12: Risk Management methodology

Risk management consists of having a risk plan by assessing the risks which involves risk identification and risk analysis. Once the probable causes of risk are identified and analysed, suitable risk handling techniques are to be developed. A constant risk monitoring along with a well defined risk handling techniques significantly reduces the failure rate of IT projects. The entire risk management is supported by adequate risk documentation which can be used for future tracking or learning from the past mistakes.

Further very few journals present the entire set of possible risks in an IT project. Schmidt et al present such a set of risks which are categorised into 14 groups as shown in Appendix B (Schmidt et al, 2001). The risks are corresponding to

- Corporate Environment
- Sponsorship/ownership issues
- Relationship Management
- Project Management
- Scope of the project
- Requirements of the project
- Funding issues
- Scheduling issues
- Development Process
- Personnel
- Staffing
- Technology
- External Dependencies
- Planning

The above risk management process and risk categories form the basis of our discussion on risk management.

3.7. Critical Success Factors:

(Fortune et al, 2005) The concept of "success factors" was introduced by Daniel in relation to "management information

crisis". Rockart used the term "Critical Success factors (CSF's)" which is defined as "the few key areas where 'things must go right for the business to flourish" and alternatively as "limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organisation". It is those factors of the project which require careful attention for the project to succeed.

In the analysis section we try to analyse the CSF's of the current infrastructure project with the information collected during the interviews and by summarising the CSF's of IT projects developed so far in the literature. In the discussion section we compare and discuss the above two parts to identify the CSF's for the current project.

Analysis

4. Analysis

4.1. Business Strategic Alignment: Over the years IT function has moved from being an in house support function to being a strategic partner in business development. Apparently the alignment of IT strategy with the business strategy is a fundamental step in developing a business case, which to a large extent determines the projects approval by the executive board. The development of IT strategies and Business strategies is a complex procedure especially in a global company like Experian. Experian global is divided into several regions which include UK&I, EMEA, US, Asia Pacific, Latin America, emerging countries like India. There exists a global business strategy for all the regions (Experian Corporate Strategy, 2009) but at the same time each region is responsible for its own profit and loss account as a result they have a local business strategy suitable to the regional market conditions. Thus the IT strategy should be aligned to both global and regional business strategies.

Experian has various committees for approving a business case and allocating the business development funds depending on the investment size. They are Global SPC (Special Project Committee) UK & I SPC, BAU, each of which can approve a budget of size which is in descending order correspondingly. A huge investment like the IT infrastructure refresh (Project Mort) has to be approved by the Global SPC, a compelling business case with sound strategy is essential.

According to Andy Hey (Director Strategic Programmes) and the Project Mort team, the main strategic reasons for IT infrastructure refresh include

- To eliminate the dependency on the M204: a legacy database technology which is not being improved by the vendor CCA and is currently used by very few businesses across the world. The skill base corresponding to M204 is decreasing in turn increasing the costs and dependency for product development. M204 increases the cost and time for product development due to its inflexible legacy technology, license fee, skill shortage etc.
- Increasing the competitive gap: The data assets possessed by Experian are unmatched in the industry. Some of the competitors are able to develop and introduce products to the market much quicker; however they are powered by inadequate data assets. A more efficient IT infrastructure will put Experian well ahead of the competitors.
- Compliance with global technology platforms: will enable knowledge sharing and will increase the technological and product compatibility. Learning from different regions reduces the learning curve required to develop and grow new business opportunities.
- Harnessing the value of siloed databases: Integrating the various data assets can enable delivery of value added products that is unrivalled in the industry.
- Reducing costs: By reducing the cost of development, license fee etc increases the profit margins even at a lower market price that is non imitable by the competitors at least in the short term, providing a first mover advantage which can increase the market share of Experian and help sustain the competitive advantage.

With further interviews with senior product mangers and marketing managers it was found that the same strategic reasons for investment resonate across the functional units.

4.2. Stakeholder Engagement:

Figure 13: Stakeholders in Experian IT infrastructure project

The various stakeholders involved in the project are as shown in the figure 13 above. Stakeholder engagement and communication management is indispensable for a successful project. Engaging stakeholders is essential to ensure that the significance of the project and its impact on UK business development is well

understood by all the stakeholders and at the same time it's important for securing the approval or commitment to implement the project. Stakeholder engagement can help to reduce risks and costs involved in the project.

It was also found during the interviews that securing approval from the Global and UK executive boards at every stage of the multiyear project is crucial. Consequently engagement strategies are necessary to ensure that senior management is committed to the success of the project.

Understanding the requirements of the product development team (internal clients) and delivering a robust infrastructure which supports their needs is crucial. Consequently communication plays a key role while transforming the business specifications into IT functional specifications.

The other significant concern expressed in the project is the challenge in engaging the clients and running the business while data is being migrated from the existing database to the new database. The clients should be unaware and the service should be uninterrupted by any risks posed by the project. As in project management, stakeholder engagement is mainly limited by the shortage of time and resources.
A significant risk faced by the project is the vendors or suppliers inability to meet their deadlines which can induce significant delays in project delivery. A synchronisation of project deadlines and strong communication is essential to avoid such a situation.

Internal marketing and external marketing about the benefits of the projects is vital. Considering the fact that a large amount of benefits are intangible marketing such benefits is tricky, constant interaction between the marketing team and IT team is essential for increasing the awareness.

4.3. Value Proposition:

4.3.1 Expected Value:

Understanding the expected business values that the new IT infrastructure should deliver, provide a set of goals that have to be strived for to realise the business value. The business values of IT expected by the managers are many. Most client managers and IT managers have different priorities of values that can be delivered by the IT infrastructure (Wateridge, 1997).

Similarly in the case of new infrastructure development, for some of the managers the increase in market share that is potentially due to the new infrastructure is the main expected value. Many managers in the company opined that IT infrastructure can add value by its capacity to deliver service and products in a short turnaround time that can facilitate a quicker response to market conditions than the competitors. Delivering products to the market in a short period of time relates directly to the presence of reusable software components in the infrastructure. The new infrastructure should have reusable software components that can facilitate even quicker product development.

The new IT infrastructure should support the creation of distinct products that add value to the customer and makes customer dependent on Experian to generate long term customer loyalty. The new infrastructure with the integrated databases can create distinct products by supporting the entire life cycle of business development which includes acquisition of customers, managing customer, collecting

debt, customer retention. The managers also expected a more efficient infrastructure that can increase the efficiency of the users with better products which are more comprehensive, capable of having pre populated data (from multiple databases) and having more options for querying.

Apart from the expectations, the managers are also compelled to create a new infrastructure due to many business necessities which have to be compulsorily addressed. Cost and quality are the two major factors with which the new infrastructure is concerned. The new infrastructure should be capable of delivering products at lower cost which in turn can increase the profit margin even at lower prices. While achieving cost leadership is one dimension, delivering differentiated products offering better quality than the competitors is of utmost importance to improve customer satisfaction.

In addition to the above expectations and needs, a single platform compliant with Experian Global platforms increases the flexibility and the opportunities for growth and market expansion. Brynjolfsson et al (Brynjolfsson, 1997) are of the opinion that 90% of the benefits of an Infrastructure investment are intangible and firms with such infrastructure have a higher financial market value. Identifying the intangible value is also a part of our discussion.

4.3.2 Value Generation Process:

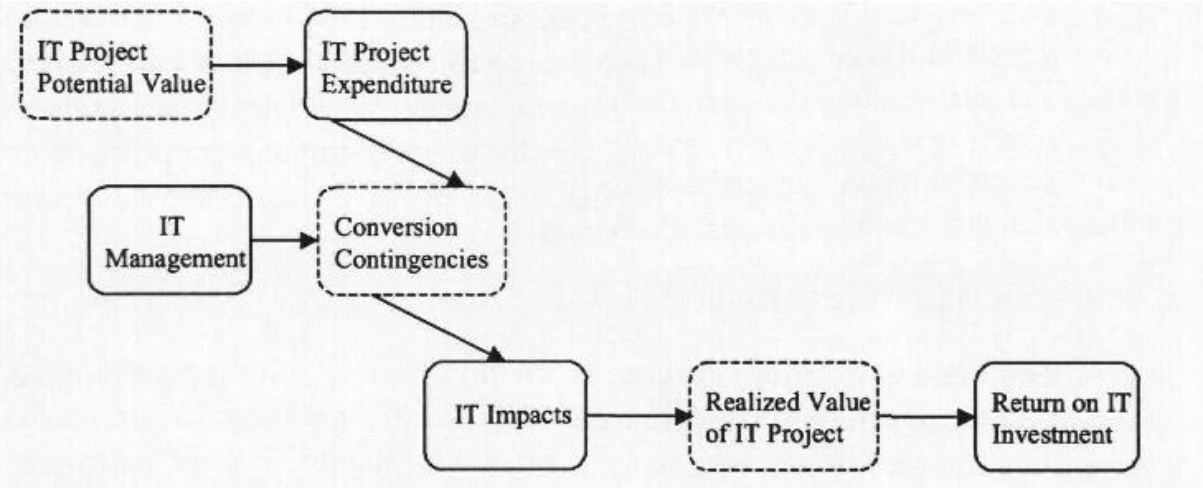


Figure 14: IT value generation process

The potential project value is the expected project value even before the IT investment is made. Davern et al (Davern et al, 2000) coin a term conversion contingencies (some of which are controllable by management) that impacts the realized value of the IT project. These conversion contingencies consists of a wide variety of influencing factors like competitor actions, government, strategy choices, knowledge dissemination, risk aversion etc that affect the business value. Consequently those factors have to be considered in determining the business value of IT.

4.3.3 Value Measurement:

The returns on the IT investments have been the subject of interest of many authors. The correlation between expenditures and profitability cannot be easily determined (Dehning et al, 2002). This paradox in IT investment and IT contribution is explained due to many reasons (Scholar, 2009). They can be grouped as

- Mismeasurement of Outputs and Inputs: It is possible that the benefits are quite large both financial and non

financial due to which there is no proper index that can accurately measure the benefits of IT.

- Lags in benefits: There is a significant lag between cost and benefits. The lags due to learning and adjustment are not taken into account. Further looking at the short term benefits may not always be the right choice and on the long term the payoffs can be proportionally larger.
- Redistribution: The benefits of IT are distributed across the firm and can even be spread across the industry as a result. As a result quantifying these benefits to the bottom line of output is not always possible.

4.4. Roles and Responsibilities: Experian UK has a well defined set of IT governance structure defining the roles and responsibilities required in the various IT processes. Defining the various roles and responsibilities is a crucial step in business IT alignment especially in an Infrastructure project.

IT infrastructure (Schmidt et al, 2001) literature suggests that it is not always possible to predict all the roles necessary in the project well in advance. As a result the roles required are determined to a certain extent as the project evolves. A good idea about the roles required can reduce the delays in the project that can arise due to unavailability of relevant staff. The stakeholders in the infrastructure project are numerous and their participation plays a vital role in the success of the infrastructure project. The infrastructure project with well defined roles enables effective communication, and the well defined responsibilities derives the benefits of those communications which can be effectively realised to deliver maximum benefits through the Infrastructure project and increase the business value.

As mentioned earlier Experian's business is classified into four business activities which manages thousands of products and

services. The infrastructure development process will involve roles capable of understanding the requirements and expectations of the various activities. Roles also include roles for leading, monitoring, controlling, allocating resources, etc.

Obviously multiple technical roles developing the infrastructure under project management, architecture development, design, development, testing etc are to be considered. This can be spread over at the company and as well as the offshore development centre.

In an infrastructure project, particularly in a service industry, human capital is the biggest cost factor. When defining the roles it is also important to consider the costs associated with it. It is possible that more number of roles not only increases the cost but can also increase the complexity. It is not usual that multiple roles are assigned to an individual in the IT project.

The time and cost involved in training, setting up the systems, providing necessary tools, software licenses is significant. Consequently the infrastructure project should consider the corresponding time lapse in the project. Working together with the human resources department can ensure that adequate skilled staff is available in a timely manner.

4.5. Risk analysis:

One of the most effective components of business case to ensure the success of IT projects is by risk management which involves risk identification, risk categorisation and preparing corresponding contingency plans. By understanding the risks well in advance and having suitable risk mitigation/risk avoidance/risk transfer/ risk acceptance methodologies we can reduce the delays in the projects and be ready to handle any interruption faced during the project implementation.

There were many risks expressed by the managers during the interviews. The discussion section will include the analysis of these

risks and identification of many other risks faced during the project through the existing academic literature.

- One of the key risks during the project is the client management during the project where data is being migrated from existing systems to the new systems and ensuring that P&L accounts are unaffected.
- Developing an infrastructure that is adaptive and flexible to future business demands is complex. The new infrastructure should not create any rigidity that can deter innovation or opportunities in the market.
- Reduced skill base of people who have a good understanding of the existing legacy system can create difficulties in building an equivalent new system with better performance.
- Maintaining a competitive position in the market with new products and support can be hard while the skill base is significantly engaged in the project mort along with their regular responsibilities.
- The availability of key resources at the right time is crucial, working with the HR team and planning the resource requirement very early in the project is necessary.
- It is also necessary to convince the clients to migrate to new systems and not all the clients may be ready to do so.
- Concentrating more on the short term payback rather than the long term growth can affect the commitment of the executive board to Project Mort.
- Risks in loading data: Setting up new systems and migrating existing loads of data is time consuming, adequate planning is necessary to ensure a smooth project development life cycle.
- Risks inherent due to logical complexities in converting a data centric model to a person centric model.
- Risks in business ownership of overlapping activities.
- Challenges in like for like testing of existing and new systems

4.6. Critical Success Factors:

In the first stage of our analysis of critical success factors we consolidate the CSF's available in the literature and in the second stage we analyse the information collected in the interviews about the key areas that require careful attention throughout the project.

The CSF's available in the literature can be summarised as in the tables below.

(Teo et al, 1999)
Top management is committed to strategic use of IT
Information Systems management is knowledgeable about business
Top management is confident in the IS department
The IS department provides efficient and reliable services to the user departments.
There is frequent communication between the user and IS department
The IS staff are able to keep up with advances in IT
Business and IS management work together in partnership in prioritizing applications development.
Business goals and objectives are made known to the IS management
The IS department is responsive to user needs.
Top management is knowledgeable about IT
The IS department often comes up with creative ideas on how to use IT strategically.
The corporate business plan is made available to IS department.
There is a set of organisational goals and objectives for IS department
The planning horizons for IS business are similar
Users actively participate in IS planning

(Chow et al, 2007)
Delivery Strategy (regular delivery of products, delivering most important features first etc)
Agile Software Engineering Techniques (well defined coding standards, simple design, right amount of documentation, rigorous design)
Team Capability (competence, expertise, motivation)
Project management process (requirement management, project management, configuration management, progress tracking, strong communication)
Team Environment (Collocation of whole team, coherent self organising team, small teams)
Customer Involvement (strong customer commitment and presence)
(Fortune et al, 2005)
Support from Senior Management
Clear realistic objectives
Strong detailed plan kept upto date
Good communication
User/Client Involvement
Skilled sufficient staff
Effective change management
Competent project manager
Strong business case
Sufficient resources
Good leadership
Proven/Familiar Technology
Realistic schedule
Risk management
Effective monitoring control
Adequate budget

Good performance by suppliers/ consultants/ contractors
Post implementation Review
Political stability
Past Experience
(Mendoza et al, 2006)
Good Communication
Appropriate Security Strategy
Scope management
Support by senior management
Known organisational structure
Outsourcing management
Standard documentation
Technical support
Expertise of the project team
Careful strategy implementation
Change management
Training
User involvement
Project management
Significant administrative support for the project.
(Niazi et al, 2006)
Higher management support
Training
Awareness
Allocation of resources
Staff involvement
Experienced staff
Defined implementation methodology
Communication
Facilitation
Project Management

Formal Documentation
Review
Improvement initiatives
Company Culture
Quality Assurance
Measurement
Customer Satisfaction
Automated tools/packages
High staff moral

As mentioned in the literature review the critical success factors are those few areas that should require constant and careful attention throughout the project to ensure success. The interviews were carried with respect to several areas of business, the key concerns were identified while discussing about many business areas. The above consolidated literature and inputs from interviews around many business areas are used to determine the CSF's in the discussion section. The areas around which the key concerns were expressed during the interviews are stated as below.

- Business
    - Challenges with customer management while the project is in progress and both the current and new infrastructure is running during the project.
    - Complexity in defining the scope
    - Switching the clients from old infrastructure to new infrastructure is to be ensured. Clients have to buy in the benefits of the new infrastructure.
    - Finding return on investment as quickly as possible is important.
    - Ownership issues: Having well defined roles and responsibilities to ensure that each task is accountable and associated to a business owner is essential
    - Securing higher management commitment throughout the duration of the project is difficult.

- Increasing the speed of product development so that products can be delivered to market much quicker than the competitors. This rate of product development curbs the innovation in the organisation.
- Challenges in measuring the benefits of the new infrastructure as substantial benefits are not directly related to the financial success of the project.
- Roadblocks in finding adequate skilled resources.
- The infrastructure required by the clients to use Experian products should be minimized.
- The new infrastructure should significantly reduce the cost of product delivery.
- The integration of siloed databases should facilitate the company to enter new vertical market segments.
- Market acceptance and customer satisfaction is crucial for any product's success.
- A more flexible infrastructure with better capabilities is necessary to compete aggressively in the market.

- Technical
  - The new infrastructure should provide better functionality with respect to matching, loading, retrieving data. Consequently the corresponding quality of the products should be increased.
  - Presence of many reusable components in the old infrastructure that are not yet present in the new infrastructure can affect the development process and turnover time.
  - Finding skilled personnel in the new technical domain is necessary.
  - Training and new employee induction can considerably affect the project schedule
  - Some of the legacy applications do not have sufficient documentation.
  - Document management is a key challenge.
  - Ensuring adequate time window for Testing is vital.

- Data loading issues: Time consumed in migrating billions of records of data to new systems has to be taken into account.
- Handling the volatility of data which occurs every day while the project is in progress needs very good technical expertise.
- Like to like testing of the old and new systems will be difficult.

Discussion

5. Discussion

5.1. Business Strategic Alignment:

(Tallon et al, 2000) Strategic alignment has been consistently mentioned in the literature as one of the most important factors determining the payoffs of the IT project. Proponents of strategic alignment argue that the organisations incapacity to realise satisfactory IT benefits is partly due to inadequate strategic alignment. Business strategies rapidly change according to the external market conditions. Consequently a flexible IT infrastructure that can support the dynamic business strategies is essential.

By using the strategic alignment model mentioned in the literature review we can understand the business and IT strategy alignment with respect to the four domains i.e. business strategy, IT strategy, business infrastructure and processes, IT infrastructure and processes. According to the Henderson et al (Henderson et al, 1999) it is not possible to effectively implement IT strategy without considering the other three domains. In other words all the four domains should be analysed and should be in harmony for an IT strategy to deliver business benefits and enable organisation to adapt to the external challenges, changes and opportunities. At the same time IT strategy establishes a competitive advantage till the competitors catch up with the technology changes. It is not the technology which gives the competitive advantage; it is the processes which exploit the technology that provide competitive advantage. Hence IT strategy and strategic alignment are alone not the determinant of sustained competitive advantage.

Traditionally IT strategies have been based purely on technology requirements to improve the old processes. Improving old technology by ignoring the organisational processes and deficiencies can create a misalignment between IT strategy and Business strategy. Strategic alignment model helps overcome such inadequacies in the process (Luftman et al, 1993).

Steps in assessment using Strategic alignment model.

- Understanding the business strategic choice:
  The long term strategy of Experian UK (Experian Strategy) is to
    - Deepen customer relationship
    - Providing innovative product and Services
    - Support the clients by specialising and expanding to new vertical market sectors.

  Interviews with Allistair Scullion (Marketing Director, Experian UK) and Paul Speirs (Commercial Product Manager, Experian UK) concluded that such a strategic intent can be achieved by
    - Providing quality products and services and at the same time reducing the cost of delivering such a product or service.
    - Investing in the core of Experian capabilities
    - Diversification
- Identifying the initial domain in the SAM:

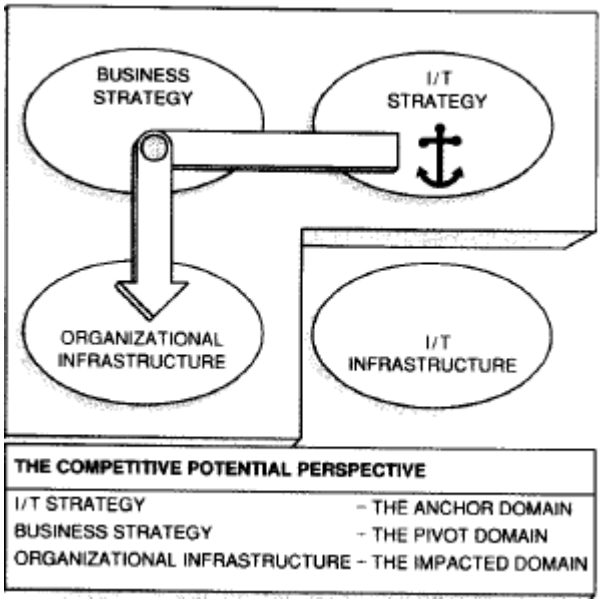


Figure 15: Strategic Alignment Model

The initial domain chosen for the strategic alignment analysis is the competitive potential domain as shown in the figure 15. Such a perspective is opted in the SAM when an emerging technology is used to leverage the current business strategies and enable or influence new business strategies. In such a case the IT strategy determines the future business capabilities, business strategy and organisational processes. The current infrastructure project is implemented to leverage the existing strategies and enable or influence the future business strategies, hence the chosen perspective.

Once the infrastructure is implemented the second perspective that can be used to align the business and IT strategies is the IT potential perspective as shown in the figure 16.

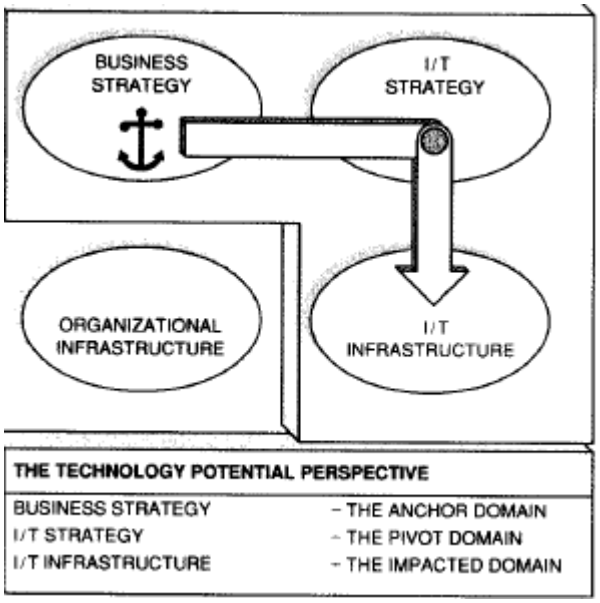


Figure 16: Strategic Alignment Model

In such a perspective an existing infrastructure is used to enable the business strategy, in other words the business strategy determines the IT strategy and the IT processes. Both the above perspectives are closely linked to each other.

- Fitting the strategy to the three domains: According to the chosen competitive potential perspective the three domains that are under consideration is the business strategy, IT strategy and organisational structure. The capacity of the organisation to exploit its technology limits business strategy more than the technology itself. The strategy fit between the business and IT is analysed with the help of the strategic intent mentioned in the first step and the IT strategy mentioned in the analysis section.
  Providing innovative products and services has been the norm in Experian. The existing technology dependent on legacy M204 has served well under the past market conditions. However with emerging technologies adopted by recently grown competitors who can serve a smaller market segment at a faster rate can impact Experian's market share. Creating a new infrastructure with emerging

technologies is essential to continue to deliver innovative products and services. The second business strategy is to deepen the customer relation. Building a flexible infrastructure that can deliver better quality products in a shorter time frame with an associated low cost of development helps to deepen the customer relationship, hence the strategic fit.

Further in the new infrastructure integration of siloed databases can help Experian drive its third business strategy of diversification by supporting clients by specialising and expanding into new vertical market sectors. The new infrastructure that harnesses the powerful data unmatched in the industry will put Experian well ahead of the competitors. Hence it is clear that there exists a strategic fit between IT strategy and the Business strategy in accordance with the Strategic alignment model.

In order to facilitate such a strategic alignment Haes et al (Haes et al, 2004) describe a strategic alignment maturity model. A well aligned business and IT strategy has the strategic alignment maturity level of 5 (Appendix C).

Thus in the case of Experian several factors have to be considered for strategic alignment. Firstly communication plays a key role in strategic alignment. The business managers should have adequate understanding of IT and IT managers should have adequate understanding of the business. There should be protocol flexibility where the project members are working in relational structure rather than in a hierarchical organisation. This can facilitate decision making, organisational learning and knowledge sharing. Further IT metrics, business metrics and service level agreements should be extended to external partners and vendors. IT should be seen as a investment center or profit center which acts as a business strategy driver or enabler.

- Incorporating the results into the fourth domain: The fourth domain according to the strategic alignment model analysis is the organisational infrastructure. The new infrastructure which enables the future business strategies acts as a driver in defining new organisational processes. Moreover the implementation of the new infrastructure is not constrained by the current organisational processes. Thus with the implementation of the new infrastructure the business strategies are affected. These business strategies in turn can change the business processes which can be either temporary or permanent.

5.2. Stakeholder Engagement: The analysis section mentioned the key concerns found during the interviews that have to be addressed through stakeholder engagement. As mentioned in the literature review section we make use of the three phase methodology for stakeholder engagement (Gable et al, 2005).

5.2.1. Phase One: Internal Preparation: This involves setting up a stakeholder team. The members of the stakeholder team (infrastructure team) should consist of representatives from the major departments within the corporation which has been presently carried out at Experian. The Infrastructure team consists of representatives from analysis and design team, build team, project management team and the business team. A five member team working with the product managers is being included with the project. The team is being lead by Andy Hey (Director Strategic Programmes) who reports to John Finch (UK IT Director).

5.2.2. Phase Two: Creating a stakeholder engagement strategy: This begins with the identification of key stakeholders. In the analysis section we identified the key stakeholders as shown in the figure. The key stakeholders can be sub classified further

however we only consider the top view of the key stakeholders crucial for the success of the project.

Further we use the Stakeholder typology defined by Mitchell et al, as mentioned in the literature review to develop the engagement strategies as shown in the table.

KEY Stakeholders	Stakeholder Salience according to Mitchell et al's stakeholder typology.	Engagement Strategies (methodologies). (Patridge et al, 2005)
Global SPC	Definitive Stakeholder	The commitment from SPC can be secured by • Marketing the project internally within the company.

		• Reporting on the progress. • Acknowledging imperfections.
UK & I SPC	Definitive Stakeholder	The commitment from SPC can be secured by • Marketing the project internally within the company. • Reporting on the progress. • Acknowledging imperfections.
Global Product Development and Delivery	Dependent Stakeholder	Engaging the product development team involves • Consultation • Project bulletins
UK Product Development & Delivery	Dependent Stakeholder	Strategies for engaging product development team involves • Consultation. • Information sharing. • Acknowledging imperfections. • Focus groups
Global Business Council	Dependent Stakeholder	Strategies to engage GBC involves • Project Bulletins. • Internal newsletters. • Consultation
UK Compliance Team	Dominant Stakeholder	The Compliance team can be engaged with strategies like • Consultation • Information sharing
UK Marketing Team	Discretionary Stakeholder	• Partnership • Letters to targeted audience • Project Bulletins
UK Finance Team	Dominant Stakeholders	• Reporting on the progress. • Consultation.

UK Sales Team	Discretionary Stakeholders	• Internal Newsletters • Project Bulletin
Perot Systems	Dependent Stakeholders	• Experian and Perot should have the same IT and business metrics. • Service Level Agreements. • Information Sharing • Employee training
Clients	Definitive Stakeholders	• Client Relationship Management • Ensuring market entry barriers • High Switching costs. • Dedicated help lines. • Letters to targeted clients.
Vendors and Suppliers	Dependent Stakeholders.	• Vendors and suppliers should have the same IT and business metrics as Experian • Service Level Agreements. • Information Sharing

The third phase involves implementing the above engagement strategies. The stakeholder engagement team defined in phase one is responsible for proposing the necessary actions, modes of engagement, proposed timings of actions and members responsible to effectively engage all the key stakeholders in the project over the coming years.

5.3. Value Proposition:

Business Value:

A business case as mentioned in the literature review presents all the values that the project can deliver. There exists a complexity in differentiating between value directly delivered by a project and value bearing capability that is enabled but not directly

attributable. Further there is a challenge in measuring the intangible benefits delivered by the project. The debate over IT value remains unsettled throughout the literature.

Tallon et al (Tallon et al, 2000) mention that the firms which are dually focussed (focussed towards external market conditions and improving operational productivity) deliver better IT payoffs than the unfocused firms.

(Davern et al, 2000) There are many complementary factors which influence the realised IT value. It includes external factors like actions of competitors, actions of regulators, technological changes in the market place, and hiring experienced professionals early in software development life cycle and internal factors like promoting the effective utilisation of the resulting system, strategy choices, training users, tolerance for change, senior management support etc.

(Best et al, 1997) Reducing the cost of Infrastructure project is one way of adding value to the project. By performing gap analysis at different stages of the project, a more accurate cost of development can be determined. Suppose three projects A, B, and C are in different stages. Project A is near completion, project B is more than half way through where as project C has some impediments, by performing the gap analysis between project A and project B, the cost of bringing project C to project B can be determined.

The benefits of a new infrastructure with integrated databases that can provide near real time information are demonstrated by the infrastructure developed by delta airlines. (Ross et al, 2002)The key feature is a publish-and-subscribe capability that makes data on flights, customers, crews, equipment and baggage simultaneously available to appropriate delta systems and employees. Formerly, silo systems had kept Delta from responding

accurately to customer questions. But with the new infrastructure, the company was able to develop systems to serve customers accurately and efficiently, facilitate equipment and crew assignments during irregular operations and support new airline-security measures.

By using the models mentioned in the literature review and the expectations, value generation process mentioned in the analysis section we can identify the key business values that can be delivered by the project.

Model 1: Three dimensions of IT value (Hitt et al, 1996): As mentioned in the literature review, productivity, business profitability and consumer surplus are three different measures of IT value. Accordingly the values delivered by the project in each aspect can be mentioned as

Productivity:

- Reduced lead time (product turnover time)
- Better decision quality can enable IT strategy
- Improved responsiveness
- Ability to support new processes
- Increased employee satisfaction

Business Profitability:

- Reduced cost on skilled employees as higher percentage of skilled personnel are available and more aware with new technologies
- Improved product position
- Ability to support new products and services
- Increased competitive advantage
- Increase in firms value in the financial market

Consumer Surplus:

- Increase in the quality of products and services
- Improved Customer Service

Model2: IT business value model (Melville et al, 2004):

The benefits considered from the perspective of

Focal Firm:

- Reduced cost of development,
- Reduced cost on skilled employees as higher percentage of skilled personnel are available and more aware with new technologies
- Better decision quality can enable IT strategy
- Increase in the quality of products and services
- Ability to support new processes
- Increased employee satisfaction

Competitive Environment:

- Improved product position
- Improved responsiveness
- Ability to support new products and services
- Improved Customer Service
- Increased competitive advantage

Macro Environment:

- Increase in firms value in the financial market

Model 3: Process Oriented model of business value:

Benefits are measured according to the automational, informational, and transformational effects as mentioned in the literature review section.

Automational effects:

- Reduced development cost due to reusable components.

Information effects:

- Reduced cost on skilled employees as higher percentage of skilled personnel are available and more aware with new technologies
- Better decision quality can enable IT strategy

Transformationl effects:

- Improved product position
- Increased competitive advantage
- Increase in firms value in the financial market

- Increase in the quality of products and services
- Improved responsiveness
- Increased employee satisfaction
- Ability to support new products and services
- Ability to support new processes

Measurement of Value:

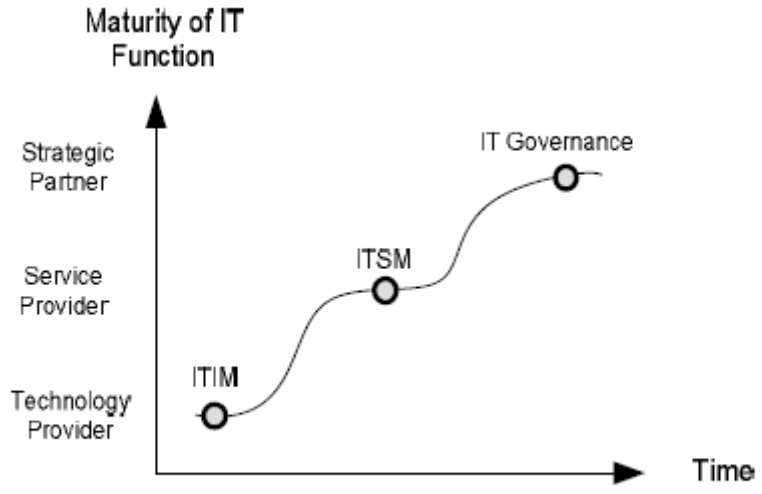
There is a huge challenge in measuring the benefits delivered by the IT projects. (Hinton et al, 1999) Moreover the benefits are derived over a long time horizon and spread across the several business units in the organization which increases the complexity in measuring the business value.

Further a majority of benefits are intangible that is not easy to define or measure. These intangible benefits do not directly affect the financial results of the company but can be more significant than the tangible benefits in determining the IT payoffs.
The complexity in the measurement of IT value is further affected by the delays in the realisation of benefits. The strongest impact of IT investment can have a lag of 2 to 3 years.
(Hitt et al, 1996)The financial benefits of IT can be measured by evaluating the return on assets or return on equity or return on shareholder value.

But a more thorough evaluation of benefits is required to measure the business value of IT. (Zee et al, 1999). In order to measure not only the financial benefits but also non financial benefit an IT business balance scorecard which takes into account the financial aspects along with other aspects like user orientation, operational excellence, future orientation should be used.

5.4. Roles and Responsibilities:

The IT function has changed over the years to become a strategic partner in business as shown in the figure 17. (Salle et al,2004)



Evolution of the IT Function within organizations

Figure 17: IT function maturity

IT has evolved from being an in house technology provider, a service provider to a strategic partner to increase the business value and is fully integrated with the life cycle of the business process. Consequently, IT governance capable of aligning IT with business objectives requires a well defined architecture of roles and responsibilities that ensure success of the business.

Several authors mention about centralising the responsibilities of the Infrastructure development. By centralising the responsibilities in house by picking up the best experts in the organisations and having a right methodology will significantly reduce the dysfunctional arguments in the project (Best et al, 1997)

We can determine the necessary roles by using the Rau's (Rau et al, 2004) concept of roles along with a bottom up approach where

by knowing the necessary functions in an IT project we can determine the roles and responsibilities.

With Rau's model we know that we require an IT steering committee which can provide organisational direction along with the CIO of the company. Further Rau also mentions about each major IT project undertaken by the organisation to be headed by a User Program Manager. These roles have different titles in different companies.

Further Haes et al (Grembergen et al, 2004) mention many functions from which the roles can be determined.

- The knowledge management and configuration management tasks ensuring all the vital documentation are easily accessible and understandable throughout the project is very much necessary.
- A standards committee which ensures that various modules of the project follow a standard set of guidelines during the project (Best et al, 1997).
- A service management function which offers support to the various teams during the project execution period.
- An audit committee supporting the standards management function.
- Incident and problem management function both for the project and the external clients during the migration period.
- Change and release management function to ensure that various phases in the project are managed and executed accurately in a flow.
- Financial management function for effective utilisation of resources and budget.
- Business Relationship management during the project.
- Supplier, Vendor management.

It is also common that single role carries out multiple functions. The interaction with various product departments is imperative during the project. However the product managers who constantly work with clients, sales team, and marketing team can be stretched with the new infrastructure project which was the case in

the Delta Airlines (Ross et al, 2002). Delta Airlines which implemented an infrastructure project introduced 50 line managers who were constantly in touch with the various business units. These line managers were the key enablers in the infrastructure project. Apart from the business roles there are many technical roles that have to be surely considered. The technical leads, technical architects, technical designers steering the technical side along with the project managers, test leads, software developers, software testers.

5.5. Risk management:

Based on the Schmidt et al classification of Risks, the 14 groups of risks as mentioned below is used to identify, assess, develop countermeasures for the risks as shown in the table.

- Corporate Environment:
- Sponsorship/ownership issues
- Relationship Management
- Project Management
- Scope of the project
- Requirements of the project
- Funding issues
- Scheduling issues
- Development Process
- Personnel
- Staffing
- Technology
- External Dependencies
- Planning

There are mainly four methods of handling risk (Baccarini et al, 2004). They are

Risk Avoidance: Avoiding the activity which involves risk

Risk Mitigation: It is the most common of all methods and involves reducing the impact or probability of the risk.

Risk Acceptance: is to accept risk retention and the consequences of the risk.

Risk Transfer: involves sharing or transfer of risk to another party.

Appendix D contains some of the risk treatment strategies for different IT risks based on which the risk countermeasures are developed.

Risks	Probability	Risk Level	Countermeasures.
1. Corporate Environment			
A restructuring of corporate structure or change in the members of steering committee can affect the commitment towards the project.	High	Medium	Well defined project roles and responsibilities. Marketing the project.
Any major merger or acquisition can affect the project's progress and direction.	Medium	Low	Flexible architecture and infrastructure that can handle mergers and acquisitions. Re estimation of the project.
A mismatch in the corporate culture and the work culture of the project.	Low	Low	Increasing the awareness about company culture. Working with human resource team to provide better work life quality.
Competitors are aggressive	Medium	Low	Constantly

during the transition period and can come up with more new products.			engage with customers. Maintain the market entry barrier.
Clients can support a new player in the market to curtail market dominance by few players which can affect the benefits realised by the project.	High	Medium	Maintaining the market entry barrier. Managing client relationships. Setting clear expectations about the project.
2. Sponsorship/ownership			
Lack of top management commitment to the project	Medium	High	Market the project, Manage stakeholders, Engage management early in the project.
Lack of clients buy-in of the project	Low	High	Engaging the clients in the early stages of the project.
Failure to involve end users in the project development	Medium	Medium	Understanding end user requirement and developing strategies with the end users.
Conflict in requirements between various user departments.	Low	Low	Consulting with various stakeholders.

			Base lining the requirements.
Lack of awareness about the project plan among various stakeholders.	Low	Mediu m	Involving stakeholders in project planning. Marketing the project.
3. Relationship Management			
Mismatch in expectations and failure to reinforce expectation levels	Low	High	Consult with key stakeholders regularly and manage expectations.
Lack of time availability of Internal clients (product managers)	Medium	High	Creating an additional team that reduces the time constraints of product managers.
Limited and inadequate window for testing.	Medium	High	Having a sound project plan. Schedule management.
Failure to identify all the stakeholders in the project	Low	Low	Perform a thorough stakeholder analysis. Identify the key stakeholders early in the project.
Difficulty in figuring out the expectations of the users in	Medium	Low	Consulting the strategic team

next ten years.			and making suitable changes to the project accordingly.
Lack of knowledge of application or the organization among the user representatives who provide the requirements.	Low	Medium	Training users. Implementing a knowledge management process.
4. Project Management			
Scope creep: inadequate change management process to control scope and budget	High	Medium	Implementing a effective change management process. Signoffs at each stage.
Improper definition of roles and responsibilities and lack of effective project management methodology	Medium	Medium	Implementing an effective project management methodology (ex prince2)
Failure to review day to day progress.	Low	Medium	Monitoring project day to day.
Poor control mechanisms (improper signoffs)	Low	Medium	Tracking milestones. Gap analysis to implement a corrective action.
Poor risk management	Low	High	Effective risk management methodology. Documenting risk management process.

5. Scope			
Changing scope or objectives	High	Medium	Constantly consulting with key stakeholders, having a clear scope definition
Lack of sound business case that specifies accurate business requirement.	Low	High	Involving all the stakeholders in the business case planning. Third party and group reviews.
Improper communication between various organisation units.	High	Medium	Communication management and stakeholder engagement.
6. Requirements			
Lack of frozen requirements	Low	Medium	Enforce formal change management process. Ensure appropriate signoffs. Develop clear requirement documentation, Build documentation throughout the project life cycle.
New or unfamiliar technology for user and developers.	Medium	Medium	Using tried and tested methodologies.

			Training and knowledge management.
Over specification	Medium	Low	Tracking changes to the base lined specification.
7. Funding			
Setting the budget even before the scope and requirements are defined.	Low	High	Taking into account the complete scope and requirements to set the budget.
Underfunding maintenance	Low	Mediu m	Considering maintenance, network management, end user training as a part of the budget.
8. Scheduling:			
Setting up unrealistic deadlines, estimating schedule based on go live date rather than on actual effort	Medium	High	Perform effort analysis based on the past rate of project deliveries.
A higher priority project takes precedence	Low	Mediu m	Effective resource planning, managing the dormant stage of the project.
9. Development Process			

Trying new or untested development methodology.	Medium	Medium	Hiring skilled personnel, training in appropriate technology.
Low flexibility to inculcate change in between the project stages.	Medium	High	Developing a flexible architecture, that can adapt future changes and stratetgies.
10. Personnel			
Risks due to team dynamics	Low	Medium	Team management, Relationship management, considering personal attributes.
Lack of skilled personnel	Low	Medium	Effective planning of resources and engaging with external parties for resource procurement.
11. Staffing			
Insufficient staffing	Low	Medium	Effective planning of resources and engaging with external parties

			for resource procurement.
Employee turnover and attrition	Low	Mediu m	Conducting frequent employee satisfaction surveys. Relationship management.
12. Technology			
Using technologies which have not been successfully used in other companies	Low	High	Questioning the vendors claims. Benchmarking technologies.
Inadequate understanding about the stability of new architecture.	Low	High	Stable architecture development. Pooling highly skilled personnel to develop the architecture.
Technical Limitation is encountered during the project causing delays while the work around solution is determined	High	Mediu m	Liaise with users and stakeholders.
13 External Dependencies			
The consultants or vendors are not able to deliver or unclear of	Medium	High	Effective screening of

their roles and responsibilities			contractors, retaining the right to move out of contract, consider personal attributes in decision making.
Lack of control over vendors and consultants	Low	Mediu m	Monitor contract performance, Manage relationships
14. Planning			
Inadequate planning	Low	Mediu m	Reviewing project plans, third party and group reviews.

5.6. Critical Success Factors

In the analysis section we identified the key areas of concern and the consolidated CSF's. In this section we identify the CSF's for the infrastructure project by considering those key areas of concern with respect to the consolidated CSF's.

The top management support has been consistently ranked among the literature as one of the most CSF's essential for successful completion of IT projects. Even in Experian the key area of concern is securing commitment from the top management. Especially since the project is a multiyear project, the changes that occur in the corporate structure should not affect the progress of the

project. Consequently at each stage of the project it is necessary to secure approval and commitment from the senior management.

Delivery Strategy is a critical success factor mentioned in the literature which in the current scenario relates to the delivery of uninterrupted service and products to the clients while the project in progress makes use of both the old and new systems. The downtimes should be anticipated well in advance and technical architecture should be flexible enough to handle exceptions.

Scope management is crucial in setting up realistic deadlines; the current complexity in defining the scope of the infrastructure project is critical area of concern in the project.

While the need to deliver quick payoffs was one of the concerns in the infrastructure project, none of the literature reviews indicate the need to deliver quick payoffs as a critical success factor in project delivery.

IT governance structure with well defined roles and responsibilities is essential for the Infrastructure project, the literature identifies strong leadership and effective project management processes as a critical success factor.

Post implementation review is one of the critical success factor mentioned in the literature, correspondingly in the current infrastructure project measuring the benefits of the infrastructure pose a significant challenge.

Availability of skilled staff has been a key area of concern in both the literature and in the current infrastructure project.

The skilled resources with knowledge about the existing infrastructure in Experian are limited. The critical success factor is to find or train resources about the existing infrastructure.

Client involvement and user interaction is a critical success factor in literature and in the current infrastructure project.

The planning horizons for the business and IT management should be similar.

Training new employees and their induction takes significantly long time; consequently team capability is one of the critical success factors in both literature and in Experian.

A strong business case is one of the most vital success factors in delivering an IT project.
Communication plays a key role in the success of the project. Communicating with various stakeholders identified as absolutely necessary in the literature.
Formal document management system is vital in an infrastructure project. In the current infrastructure project documenting the existing system is a key challenge.
Motivation and high staff morale has been reported as one of the significant factors influencing the success of the project. The roadblocks that require a work around solution in an infrastructure project can be many. High staff morale and motivation plays a crucial role in such situations.

From the above comparative discussion the critical success factors in the Infrastructure project can be summarised as shown in the table.

Critical Success Factors in the current Infrastructure project.
Top management commitment to the project
Strong business case
Scope management
Good Project management methodology
Training
Post Implementation Reviews
Well defined IT governance structure
Availability of skilled resources
Client Involvement
Team capability and environment
Like to like testing of the systems
Formal document management methodology
Customer satisfaction and Market acceptance

Conclusion

6. Conclusion:

The key components of the business case which are critical for delivering an IT infrastructure have been identified. Each and every component of the business case is important in ensuring the successful delivery of the project. The components like strategic alignment, risk management, stakeholder engagement ensure that the IT change is led as a business led change.

The various benefits that can be delivered by the project have been identified. The necessary roles and functions required in a massive project like IT infrastructure have been mentioned.

The components in the report like strategic alignment, stakeholder engagement, Value proposition, Risk management and Critical Success factors can significantly contribute to ensure that the IT infrastructure project is completed successfully and delivers business value.

Recommendation

7. Recommendation:

7.1. The key stakeholders in the infrastructure project have been identified. The stakeholder saliencies using the stakeholder typology have been identified. Correspondingly the various engagement strategies mentioned can be used during the project.

7.2. The various risks in the projects have been summarised. The risk management techniques mentioned in the report can be used to avoid or mitigate the risks in the project.

7.3. (Zee et al, 1999). In order to measure not only the financial benefits but also non financial benefit an IT business balance scorecard which takes into account the financial aspects along with other aspects like user orientation, operational excellence, future orientation can be used.

7.4. The various critical success factors in the project have been mentioned in the report. A constant and careful attention towards those factors is required throughout the project

7.5. The IT infrastructure project should be viewed as an Investment rather than as a cost centre, as the benefits due to IT infrastructure are derived over many years rather than immediately.

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Appendix

9. Appendix:

Appendix A: Various processes, components, techniques in Prince2 Methodology

Processes	*SU*	*IP*	*DP*	*CS*	*MP*	*SB*	*CP*	*PL*
Components								
Business Case	V	V		V		V	V	
Organisation	V	V				V		
Planning	V	V			V	V		
Controls		V	V	V	V	V	V	
Risks	V	V		V	V	V	V	
Quality	V	V		V	V	V	V	
Configuration management		V		V	V	V	V	
Change control		V		V	V		V	
Techniques								
Product-based planning								V
Planning of activities and resources								V
Change control technique		V		V	V			
Quality review technique				V	V	V		

Appendix B:

Table 3. Full List of Risk Factors

1. Corporate Environment

1.1 *A climate of change in the business and organizational environment that creates instability in the project.*

1.2 *Mismatch between company culture and required business process changes needed for new system.* A mismatch between the corporate culture and the changes required by the new system.

1.3 *Projects that are intended to fail:* Projects started for political reasons that carry no clear business value, but serve to divert the organization's focus from actual needed change. Such projects are underfunded, not supported, and are not intended to succeed. Projects have no business value and are used as diversionary tactics to avoid facing the real change needs.

1.4 *Unstable corporate environment:* Competitive pressures radically alter user requirements, sometimes making the entire project obsolete.

1.5 *Change in ownership or senior management:* New owners and/or managers set new business direction that causes mismatch between corporate needs and project objectives.

2. Sponsorship/Ownership

2.1 *Lack of top management commitment to the project.* This includes oversight by executives and visibility of their commitment, committing required resources, changing policies as needed.

2.2 *Lack of client responsibility, ownership, and buy-in of the project and its delivered system(s).*

2.3 *Failure to gain user commitment:* Laying blame for "lack of client responsibility" on the project leader rather than on the users.

2.4 *Conflict between user departments:* Serious differences in project goals, deliverables, design, etc., calls into question concept of shared ownership.

2.5 *Failure to get project plan approval from all parties.*

3. Relationship Management

3.1 *Failure to manage end-user expectations:* Expectations determine the actual success or failure of a project. Expectations mismatched with deliverable—too high or too low—cause problems. Expectations must be correctly identified and constantly reinforced in order to avoid failure.

3.2 *Lack of adequate user involvement:* Functional users must actively participate in the project team, and commit to their deliverables and responsibilities. User time must be dedicated to the goals of the project.

3.3 *Lack of cooperation from users:* Users refuse to provide requirements and/or refuse to do acceptance testing.

3.4 *Failure to identify all stakeholders:* Tunnel vision leads project management to ignore some key stakeholders in the project, affecting requirements definition, implementation, etc.

3.5 *Growing sophistication of users leads to higher expectations:* Users are more knowledgeable, have seen sophisticated applications, apply previous observations to existing project.

3.6 *Managing multiple relationships with stakeholders:* Some "clients" are also "partners" in producing deliverables in other projects. Leads to confusion of roles and responsibilities.

3.7 *Lack of appropriate experience of the user representatives:* Users assigned who lack necessary knowledge of the application or the organization.

Table 3. Full List of Risk Factors (Continued)

4. Project Management

4.1 *Not managing change properly:* Each project needs a process to manage change so that scope and budget are controlled. Scope creep is a function of ineffective change management and of not clearly identifying what equals success.

4.2 *Lack of effective project management skills:* Project teams are formed and the project manager does not have the power or skills to succeed. Project administration must be properly addressed.

4.3 *Lack of effective project management methodology:* The team employs no change control, no project planning or other necessary skills or processes.

4.4 *Improper definition of roles and responsibilities:* Members of the project team and the organization are unclear as to their roles and responsibilities. This includes outsourcers and consultants.

4.5 *Poor or nonexistent control:* No sign-offs, no project tracking methodology, unaware of overall project status, "lost in the woods."

4.6 *Poor risk management:* Countering the wrong risks.

4.7 *Choosing the wrong development strategy:* e.g. waterfall, prototyping, etc.

5. Scope

5.1 *Unclear/misunderstood scope/objectives.* It is impossible to pin down the real scope or objectives due to differences or fuzziness in the user community.

5.2 *Changing scope/objectives:* Business changes or reorganizes part way through the project.

5.3 *Scope creep:* Not thoroughly defining the scope of the new system and the requirements before starting, consequently not understanding the true work effort, skill sets and technology required to complete the project.

5.4 *Project not based on sound business case:* Users and developers ignore business requirements, develop system for sake of technology.

5.5 *Number of organizational units involved:* increased number of lines of communication and conflict potential expands the scope of the system.

6. Requirements

6.1 *Lack of frozen requirements.* Because the needs of the users change, the requirements change. Consequently the system will never be moved into production because none of the requirements are ever completed. Alternatively, freezing a subset of the functionality and delivering allows for the completion of the system and update releases as required.

6.2 *Misunderstanding the requirements.* Not thoroughly defining the requirements of the new system before starting, consequently not understanding the true work effort, skill sets and technology required to complete the project.

6.3 *New and/or unfamiliar subject matter for both users and developers:* Lack of domain knowledge leads to poor requirements definition.

7. Funding

7.1 *Underfunding of development:* Setting the budget for a development effort before the scope and requirements are defined or without regard to them (i.e., picking a number out of the air).

7.2 *Underfunding of maintenance:* Support for products in the maintenance phase. If the customer is unprepared or does not budget for this, the project can be judged a failure even if successful in all other aspects.

7.3 *Bad estimation:* Lack of effective tools or structured techniques to properly estimate scope of work. Unrealistic cost estimates cause illogical or suboptimal planning, strategy, and decisions.

7.4 *"All or nothing":* Requires budgeting entire project at the outset, leading to under funding in later years of project.

8. Scheduling

8.1 *Artificial deadlines.* Presence of unrealistic deadlines or functionality expectations in given time period. "Crash projects" in which test time or training time is reduced—using something other than work effort required to determine when the new system should move into production.

8.2 *"Preemption" of project by higher priority project:* Management unable to resolve conflicting schedule demands.

9. Development Process

9.1 *Lack of effective development process/methodology:* Leading to quality problems—Documentation, Software and Testing—poor estimating—insufficient time for up-front work, for example, design—little flexibility for change—insufficient testing.

9.2 *Trying new development method/technology during important project.*

10. Personnel

10.1 *Lack of required knowledge/skills in the project personnel:* for example, technology, business knowledge, and experience.

10.2 *Lack of "people skills" in project leadership:* PM tries to "manage" schedules, technology, requirements, etc., ignoring that management is dealing with people on the team.

10.3 *Poor team relationships:* Strains existing in the team due to such things as burnout or conflicting egos and attitudes.

11. Staffing

11.1 *Insufficient/inappropriate staffing:* Not enough people or people with wrong skills/insufficient skills assigned to project, regardless of availability.

11.2 *Staffing volatility:* At some point in the project, losing the key project manager, analysts or technicians (especially in new technology).

11.3 *Excessive use of outside consultants:* Can lead to a conflict of interest, for example, billable hours vs. budget, or resulting in the internal staff not having significant involvement

11.4 *Lack of available skilled personnel:* People with the right skills are not available when you need them.

12. Technology

12.1 *Introduction of new technology:* Using new, or "bleeding edge," technology that has not been used successfully at other companies, or major technological shift occurs during the project.

12.2 *Stability of technical architecture:* Has to be done before comparable applications.

13. External Dependencies

13.1 *External dependencies not met:* The project's consultants or vendors do not deliver, go out of business, or are unclear as to their roles and responsibilities

Continued

Table 3. Full List of Risk Factors (Continued)

13.2	*Multi-vendor projects complicate dependencies:* Integration of packages from multiple vendors hampered by incompatibilities and lack of cooperation between vendors.
13.3	***Lack of control over consultants, vendors, and subcontractors:*** **Schedule or quality problems beyond control of project manager. No legal recourse due to poor contract specification.**
14.	Planning
14.1	***No planning or inadequate planning:*** **Attitude that planning is unimportant or impractical.**

Note: Bold items represent risk factors not observed in earlier lists (i.e., [3, 4, 30]).

Appendix C

Strategic Alignment Maturity Levels			
Criteria	**Attribute**	**Characteristics level 1**	**Characteristics level 5**
Communications	Understanding of business by IT	Minimum	Pervasive
	Understanding of IT by business	Minimum	Pervasive
	Inter/intraorganizational learning	Casual, *ad hoc*	Strong and structured
	Protocol rigidity	Command and control	Informal
	Knowledge sharing	*Ad hoc*	Extraenterprise
	Liaison(s) breadth/effectiveness	None or *ad hoc*	Extraenterprise
Competency/value measurement	IT metrics	Technical, not related to business	Extended to external partners
	Business metrics	*Ad hoc*, not related to IT	Extended to external partners
	Balanced metrics	*Ad hoc* unlinked	Business, partner and IT metrics
	Service level agreements	Sporadically present	Extended to external partners
	Benchmarking	Not generally practiced	Routinely performed with partners
	Formal assessments/reviews	None	Routinely performed
	Continuous improvement	None	Routinely performed
Governance	Business strategic planning	*Ad hoc*	Integrated across, external
	IT strategic planning	*Ad hoc*	Integrated across, external
	Reporting/organization structure	Central/decentral, CIO report to CFO	CIO reports to CEO, federated
	Budgetary control	Cost center, erratic spending	Investment center, profit center
	IT investment management	Cost-based, erratic spending	Business value
	Steering committee(s)	Not formal/regular	Partnership
	Prioritization process	Reactive	Value-added partner
Partnership	Business perception of IT value	IT perceived as a cost of business	IT coadapts with business
	Role of IT in strategic business planning	No seat at the business table	Coadaptive with business
	Shared goals, risks, rewards/ penalties	IT takes risk with little reward	Risks and rewards shared
	IT program management	*Ad hoc*	Continuous improvement
	Relationship/trust style	Conflict/minimum	Valued partnership
	Business sponsor/champion	None	At the CEO level
Scope and architecture	Traditional enabler/driver, external	Traditional (e.g. accounting, email)	External scope, business strategy driver/enabler
	Standards articulation	None or *ad hoc*	Interenterprise standards
	Architectural integration • Functional organization • Enterprise • Interenterprise	No formal integration	Evolve with partners • Integrated • Standard enterprise architecture • With all partners
	Architectural transparency, flexibility	None	Across the infrastructure
Skills	Innovation, entrepreneurship	Discouraged	The norm
	Focus of power	In the business	All executives, including CIO
	Management style	Command and control	Relationship-based
	Change readiness	Resistant to change	High, focused
	Career crossover	None	Across the enterprise
	Education, cross-training	None	Across the enterprise
	Attraction and retention of best talent	No program	Effective program for hiring and retaining

Source: Luftman, J.; "Assessing Business-IT Alignment Maturity," Communications of AIS, vol. 4, 2000

Appendix D:

Table II IT risk treatment strategies

Risk event	Strategy	Percent
Inadequate third party performance	Screen contractors upfront	83
	Monitor contractor performance	39
	Retain right to remove unfit contractor	22
Litigation in protecting intellectual property	Consultative engagement	83
	Contract conditions	72
Friction between clients and contractors	Consider personal attributes	40
	Monitor contractor performance	22
	Manage the relationship	22
Diminished window of opportunity due to late delivery of software	Sound project planning and schedule management	40
	Manage expectations	33
	Obtain management support	22
Harmful competitive actions	Develop customer relationship	39
	Maintain market entry barrier	39
Software no longer needed	Establish sound business requirements	78
	Manage key stakeholders	28
Personnel shortfalls	Plan for resources	40
	Procure external parties	39
	Plan contingency options	28
	Change project management objectives	28
Poor quality of staff	Assess project staff capability	72
Corporate culture not supportive	Manage stakeholders	40
	Apply political influence	28
	Obtain executive management support	28
Lack of executive support	Market the project	33
	Engage management early	39
Politically motivated collection of unrelated requirements	Clear scope definition	40
	Consult with key stakeholders	33
Inadequate user documentation	Develop clear requirements definition	39
	Build documentation throughout the PLC	33
	Assign a document writing specialist	28
Application (software) not fit for purpose	Develop clear requirements definition	40
	Perform group reviews	33
	Obtain progressive signoff of milestones	28
Poor production system performance	Conduct comprehensive testing in near production conditions	33
	Conduct proof of concept testing	33
	Development conducted in near production conditions	22
Technical limitations of solution reached or exceeded	Develop strong technical design	72
Incomplete requirements	Obtain clear scope specification and signoff	67
	Liaise with stakeholders	40
Inappropriate user interface	Liaise with users	83
	Adopt standards for interface design	33
Unreasonable project schedule and budget	Make tradeoffs between cost, time and scope	72
	Manage expectations	28
Continuous changes to requirements by the client	Enforce formal change management process	78
	Ensure key project documentation is signed off	40
	Consult/educate user in change management practice	22
Lack of agreed-to user acceptance and signoff criteria	Consult/train the user in test design	100
Failure to review daily progress	Monitor project daily, if required	33
	Create a consultative environment	22
Lack of single point accountability	Project manager is held accountable	33
	Roles and responsibilities clearly defined	33
	Project sponsor/owner is accountable	28
	Establish clear communication and escalation hierarchy	22
Poor leadership	Appoint an experienced project manager	33
	Establish steering committee selection process and operational guidelines	39
	Utilise established communication and escalation hierarchy	33
Developing wrong software functionality	Conduct group reviews	78
	Develop clear requirements definition	39
	Obtain signoffs of milestones	33
Lack of formal change management process	Implement a formal change management system	78
	Educate users on the change management process	22
Gold plating (over specification)	Monitor and review development to baseline design	40
	Strict adherence to requirements definition	33
Unrealistic expectations	Screen proposals	33
	Develop clear requirements definition	33
	Manage customer expectations	28
	Test validity of vendor claims	28